

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 858 247 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

12.08.1998 Bulletin 1998/33

(51) Int. Cl.⁶: H05B 6/76

(21) Application number: 97306338.1

(22) Date of filing: 20.08.1997

(84) Designated Contracting States:

AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE

Designated Extension States:

AL LT LV RO SI

(30) Priority: 10.02.1997 KR 9703859

(71) Applicant:

Samsung Electronics Co., Ltd.
Suwon City, Kyungki-do (KR)

(72) Inventor: Kim, Gong-Su

Suwon-City, Kyungki-Do (KR)

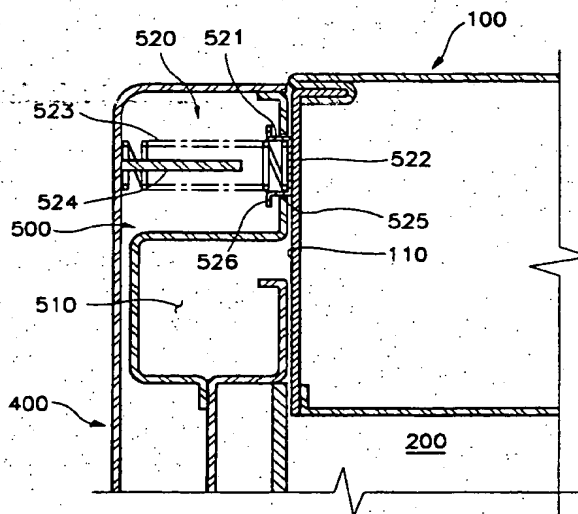
(74) Representative:

Read, Matthew Charles et al
Venner Shipley & Co.
20 Little Britain
London EC1A 7DH (GB)

(54) Microwave oven

(57) A microwave oven including a housing (100) having a cooking chamber (200) and a door (400) for providing access to the interior of the cooking chamber (200). The microwave includes means (520) for providing a seal between the door (100) and a front face (110) of the cooking chamber (200) when the door (400) is shut. The means includes a sealing member (522) biased into contact with the front face (110).

FIG. 2



Best Available Copy

EP 0 858 247 A2

Description

The present invention generally relates to a microwave oven including a housing having a cooking chamber, a door for providing access to the interior of the cooking chamber, and means for providing a seal between the door and a front face of the cooking chamber when the door is shut.

A microwave oven is a well known type of cooking appliance in which microwave energy is absorbed by water and other molecules in food which makes them move at high speeds to create frictional heat which cooks the product evenly in a short space of time.

A sectional view of the overall construction of a conventional microwave oven is illustrated in Figure 3 and includes a main body 10 defining a cooking chamber 20 and an electrical component compartment 30. The cooking chamber 20 has an open side and a door 40 hingedly connected to a front panel 10a of the main body 10 on one side of the cooking chamber 20 to enable the cooking chamber 20 to be opened and closed. A latch member 41 is provided on the door 40 facing the main body 10 corresponding to a latch lock assembly 43 provided on the front panel 10a of the main body 10. The latch member 41 engages the latch lock assembly 43 to firmly secure the door 40 in a closed position, and is released by operating a release member 45.

The electrical component compartment 30 is situated adjacent to the cooking chamber 20 and contains a magnetron 31 for producing and directing microwave energy into the cooking chamber 20, a high voltage transformer 32 to apply a high voltage across the magnetron 31, and a fan 33 for cooling the electrical components during operation. A control panel 34 is provided on the front of the electrical component compartment 30 adjacent to the open side of the cooking chamber 20.

A disc-shaped tray 21 rests on the floor of the cooking chamber 20 and a window 42 is formed in a portion of the door 40 to enable a user to see inside the cooking chamber 20 during operation of the microwave oven.

In the conventional microwave oven, when a user places a foodstuff to be cooked on the tray 21 and closes the door 40, the magnetron 31 in the electrical component compartment 30 is activated via the control panel 34 to generate microwave frequencies of 2,450 MHz in the cooking chamber 20. The microwave energy makes the molecules in the food move at high speeds, to cook or heat the food.

However, in the conventional type of microwave oven described above, microwave energy provided to the cooking chamber 20 by the magnetron 31 often leaks out of the cooking chamber 20 through a gap between the door 40 and the main body 10. This leakage, even if slight, can interfere with other electronic devices and is harmful to humans. Therefore, laws strictly regulate manufacturing standards to allow only a minimal leakage level of microwave energy.

To overcome the aforementioned problem, micro-

wave ovens have been fitted with a choke assembly 50 provided on the door 40 to prevent leakage of microwave energy. The choke assembly 50 is illustrated in Figure 4 in which the door 40 is shown in contact with the front panel 10a of the main body 10. The choke assembly 50 includes an inwardly directed choke groove 51 formed on the edges of the door 40 facing the front panel 10a of the main body 10 when the door 40 is closed, and a seal 52 made from a plastic material by an injection-molding process. The seal 52 closes an opening of the choke groove 51 and the microwave energy is prevented from leaking out of the cooking chamber 20 by being directed into the choke groove 51 in which it is mutually offset and compensated, thus eliminating leakage of microwave energy.

Microwaves having a short wavelength are, however, created inside the choke assembly 50, and due to their short wavelength, may easily leak out through small gaps. If the front panel 10a of the main body 10 and the side of the door 40 corresponding to the front panel 10a are not formed flat, a large gap may exist between them causing an increase in the amount of leakage of microwave energy from the microwave oven. Thus, not all leakage can be prevented by the use of the choke groove 51 formed on the door 40.

It is an aim of the present invention to overcome or substantially alleviate the aforementioned problem.

A microwave oven according to the present invention is characterised in that the means for providing a seal between the door and the front face of the cooking chamber includes a sealing member biased into contact with the front face.

In a preferred embodiment, the means is provided within the door and protrudes therefrom.

Preferably, the sealing member is a plate which protrudes from the door and is depressible against the bias when brought into contact with front face of the cooking chamber when the door is shut.

Preferably, the sealing plate is located in an aperture in the door and is retained by a projection formed thereon, the bias urging the projection into engagement with the door when the door is open.

Embodiments of the invention will now be described, by way of example only, in which:

Figure 1 is a perspective view of the overall structure of a microwave oven in accordance with an embodiment of the present invention;

Figure 2 is a sectional view taken along line A-A of Figure 1 and depicts a door of the microwave oven contacting a main body when a cooking chamber is closed in accordance with an embodiment of the present invention;

Figure 3 is a perspective view of a conventional microwave oven; and

Figure 4 is a sectional view taken along line B-B of Figure 3 and depicts a door of the microwave oven contacting a main body when a cooking chamber is

closed.

As shown in Figure 1, a microwave oven includes a main body 100 forming the outer housing and having a cooking chamber 200 with an open side and an electrical component compartment 300 provided therein. The cooking chamber 200 is separated from the electrical component compartment 300 which contains a magnetron 310 for generating microwave energy in the cooking chamber 200, a high voltage transformer 320 for applying high voltage across the magnetron 310, and a fan 330 for cooling the electrical components. A disc-shaped tray 210 is provided within the cooking chamber 200 and a control panel is situated on the front of the electrical component compartment 300.

A door 400 is hinged to a front panel 110 of the main body 100 to enable the cooking chamber 200 to be opened and closed. A latch member 400 is formed on the door 400 in a position corresponding to a latch hook assembly 430 provided on the front panel 110 of the main body 100. The latch member 410 engages the latch lock assembly 430 to firmly secure the door 400 in a closed position, and is unlocked by operation of a release member 450, provided next to the door 400 below the control panel. A window 420 is provided in the door 400 so the inside of the cooking chamber 200 is visible when the door 400 is closed. On the back of the door 400 which is the side in contact with the front panel 110 of the main body 100 when the door 400 is closed, is formed a choke assembly 500 for preventing leakage of microwave energy from the cooking chamber 200. The choke assembly 500 consists of a choke groove 510, formed along the edges of the door 400 on a side facing the front panel 110, and a sealing member 520 which comes into close contact with the front panel 110 of the main body 100 when the door 400 is closed to prevent leakage.

The sealing member 520 is formed adjacent to the choke groove 510, and its construction will now be described in detail with reference to Figure 2. An open race 525 is formed on the back of the door along its edges. The sealing member 520 includes a sealing plate 521 with a front end 522 protruding toward the front panel 110 of the main body 100, and an elastic member 523 supporting the sealing plate 521. The elastic member 523 provides a force to the sealing plate 521 to bias it toward the front panel 110. A projection 526 is formed at the rear edge of the sealing plate 521 to prevent the sealing plate 521 from being dislodged from the opened race 525. A guide member 524 is provided within the elastic member 523, which is a coil spring, to maintain it in position.

The operation of the microwave oven in accordance with the aforementioned embodiment of the present invention will now be described.

When the door 400 is opened, the front end 522 of the sealing plate 521 protrudes outwardly through the opened race 525, urged into position by the elastic

member 523. When the door 400 is closed, the front end 522 of the sealing plate 521 comes in contact with the front panel 110 of the main body 100, so no gap is formed between the back of the door 400 and the front panel 110. When the microwave oven is operated some of the microwave energy is introduced in to the choke groove 510 and is retracted to mutually offset each other. Also, because the front end 422 of the sealing plate 521 protruding toward the front panel 110 from the opened race 525 is firmly pressed into contact with the main body 100, a tight seal is formed thereby preventing leakage of microwave energy.

The choke assembly 500 for precluding microwave frequency leakage comprises the sealing member 520 having the choke groove 510, the sealing plate 521, and the elastic member 523.

As fully described above, the microwave oven is provided with a sealing plate on the back of the door which is elastically supported in a manner such that it contacts the front panel of the oven when the door is closed. Accordingly, this structure stops the microwave energy, generated and directed into the cooking chamber by the magnetron, from leaking out of the cooking chamber through a gap between the back of the door and the sealing plate.

Claims

1. A microwave oven including a housing (100) having a cooking chamber (200) and a door (400) for providing access to the interior of the cooking chamber (200), and means (520) for providing a seal between the door (400) and a front face (110) of the cooking chamber (200) when the door (400) is shut, characterised in that said means includes a sealing member (522) biased into contact with the front face (110).
2. A microwave oven according to claim 1 wherein the means (520) is mounted within the door (400) and protrudes therefrom.
3. A microwave oven according to claim 2 wherein the sealing member is a plate (522) which protrudes from the door (400) and is depressible against the bias when brought into contact with the cooking chamber (200) when the door (400) is shut.
4. A microwave oven according to claim 3 wherein the sealing plate (522) is located in an aperture (525) in the door (400) and is retained by a projection (526) formed thereon, the bias urging the projection (526) into engagement with the door (400) when the door (400) is open.
5. A microwave oven according to claim 3 or 4 wherein the sealing plate is biased by a coil spring (523).

6. A microwave oven according to claim 5 wherein the spring (523) is supported on a guide rod (524).
7. A microwave oven including a main body with a cooking chamber having an open side to which microwave frequencies are provided and a door for opening and closing the cooking chamber and having a back facing a front panel of the main body comprising a sealing member formed on the back of the door and elastically supported to closely contact the front panel of the main body when the door is closed, thus preventing microwave frequencies from leaking out of the cooking chamber.
8. A microwave oven as set forth in claim 7 wherein the sealing member comprises a sealing plate with a front end protruding from the back of the door toward the front panel of the main body, and an elastic member installed in the door and elastically supporting the sealing plate such that the front end of the sealing plate comes in close contact with the front panel of the main body.
9. A microwave oven as set forth in claim 8 wherein an opened race is formed on the back of the door into which the sealing plate fits, and the sealing plate includes a projection on its both rear ends for preventing the sealing plate from being dislodged from the opened race.
10. A microwave oven as set forth in claim 2 wherein the elastic member is a coil spring, and the door has a rod-type guide member to maintain the elastic member in its fixed position.

FIG. 1

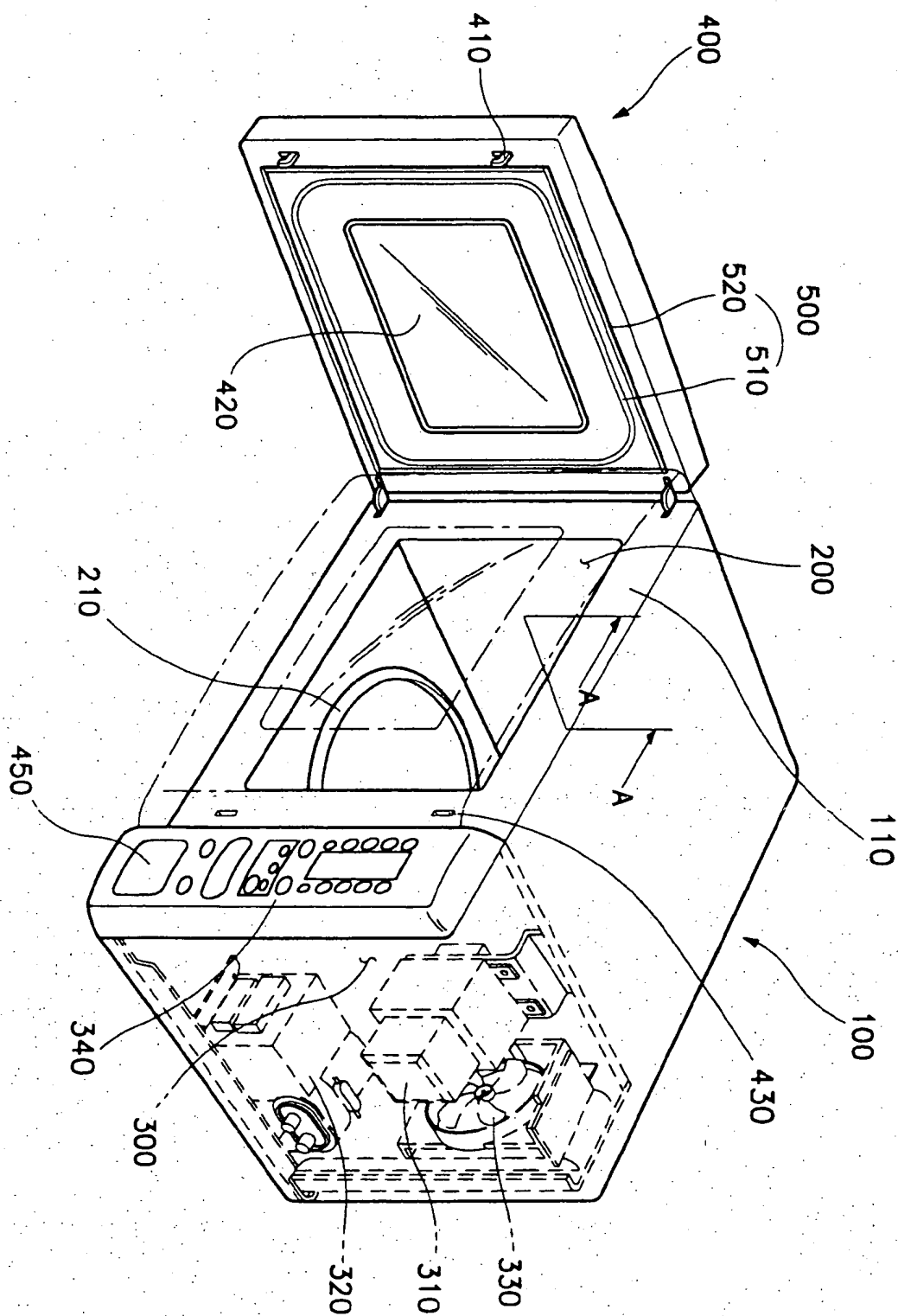


FIG. 2

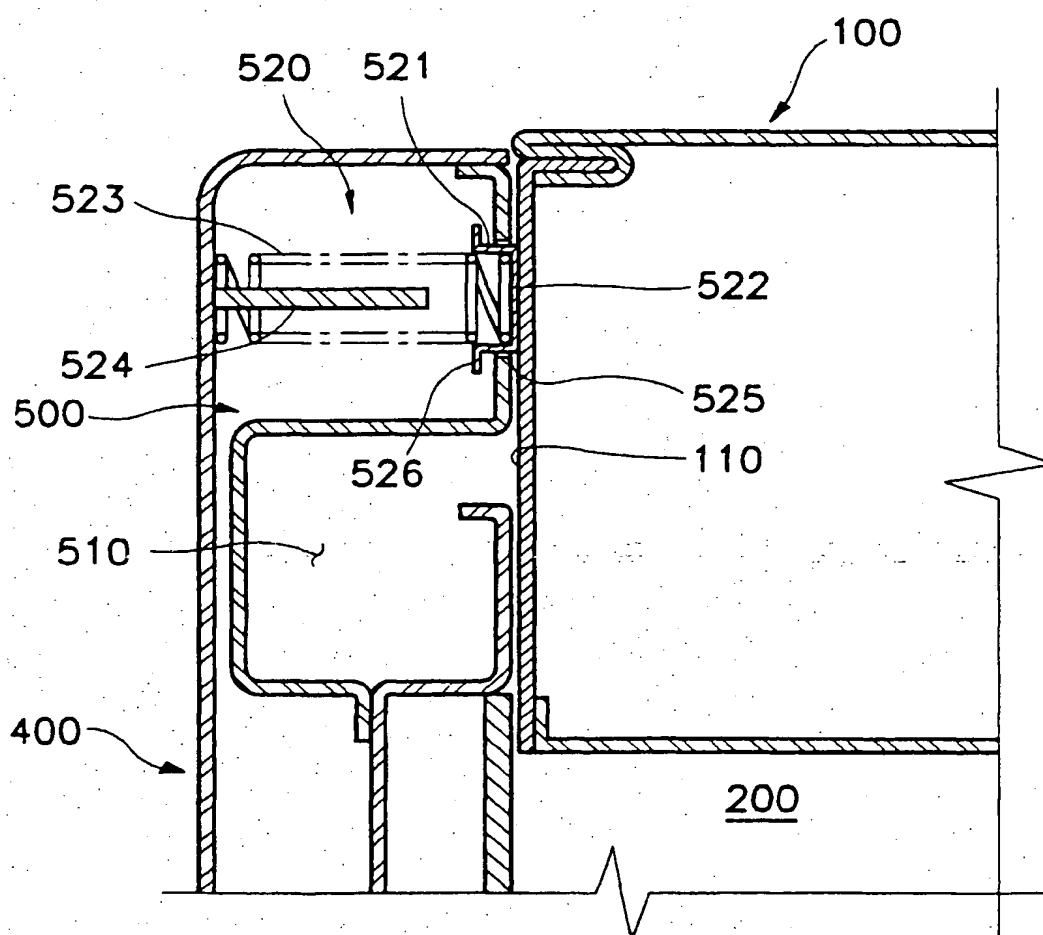


FIG. 3
(PRIOR ART)

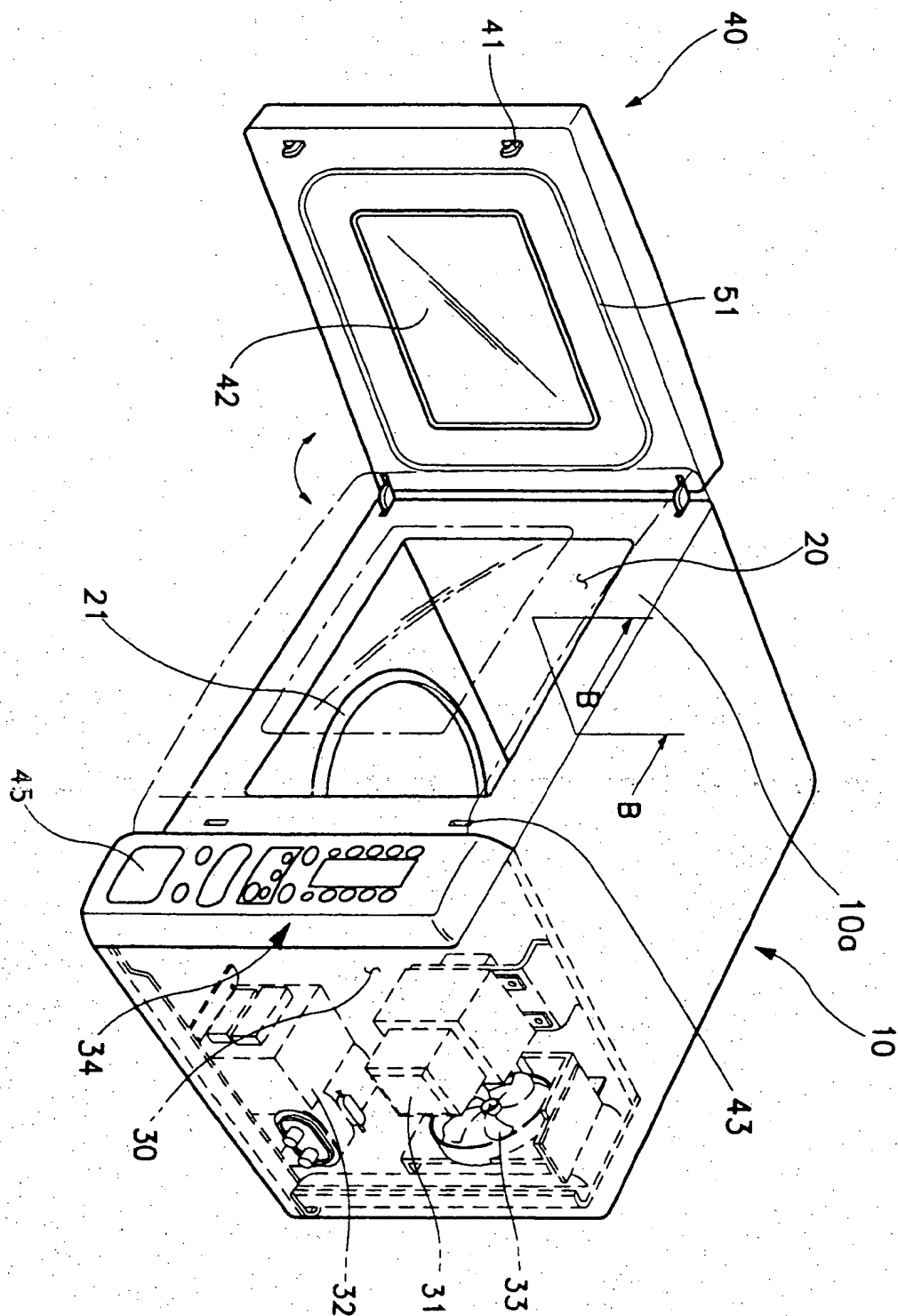
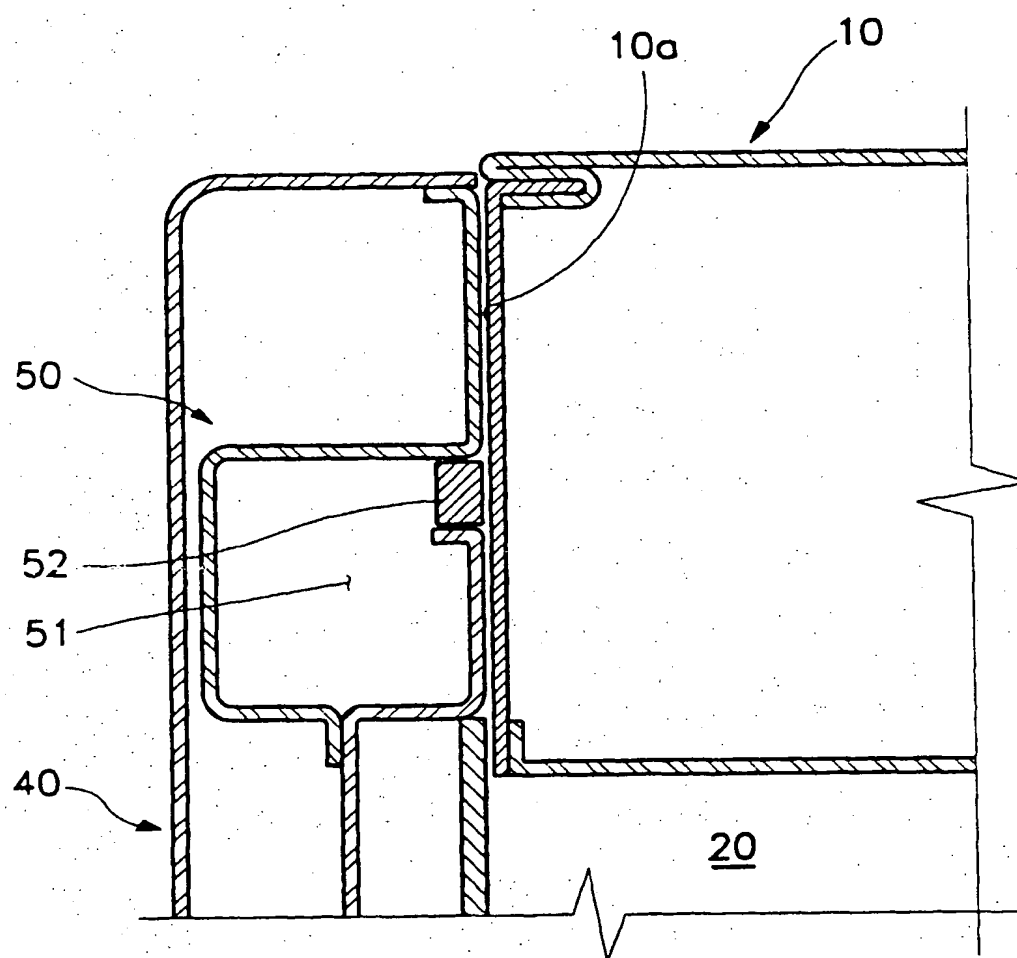
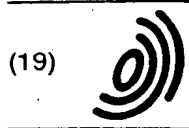


FIG. 4
(PRIOR ART)





Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 858 247 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
28.10.1998 Bulletin 1998/44

(51) Int. Cl.⁶: **H05B 6/76**

(43) Date of publication A2:
12.08.1998 Bulletin 1998/33

(21) Application number: 97306338.1

(22) Date of filing: 20.08.1997

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**
Designated Extension States:
AL LT LV RO SI

(72) Inventor: **Kim, Gong-Su**
Suwon-City, Kyungki-Do (KR)

(74) Representative:
Read, Matthew Charles et al
Venner Shipley & Co.
20 Little Britain
London EC1A 7DH (GB)

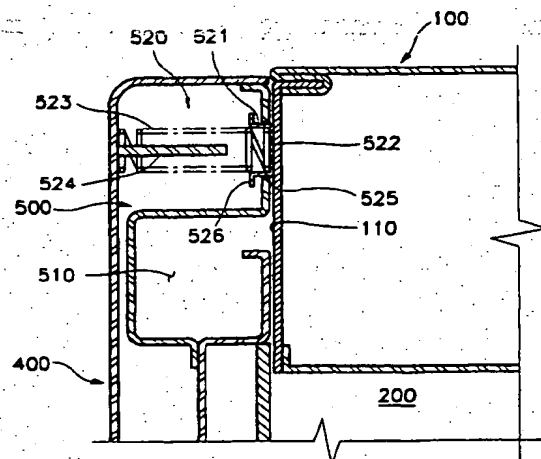
(30) Priority: 10.02.1997 KR 9703859

(71) Applicant:
Samsung Electronics Co., Ltd.
Suwon City, Kyungki-do (KR)

(54) **Microwave oven**

(57) A microwave oven including a housing (100) having a cooking chamber (200) and a door (400) for providing access to the interior of the cooking chamber (200). The microwave includes means (520) for providing a seal between the door (100) and a front face (110) of the cooking chamber (200) when the door (400) is shut. The means includes a sealing member (522) biased into contact with the front face (110).

FIG. 2



EP 0 858 247 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 30 6338

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 3 210 512 A (J. LYONS & CO.) 5 October 1965 * claims 1,3 *	1-3,5-8, 10	H05B6/76
X	US 3 304 401 A (GENERAL MOTORS CORP.) 14 February 1967 * claim 1 *	1	
X	DE 19 06 621 B (LICENTIA PATENTVERWALTUNGS-GMBH) 3 September 1970 * the whole document *	1	
A	GB 998 390 A (J. LYONS & CO. LTD.) * page 3, column 122 - page 4, column 13 *	1	
A	CH 428 029 A (J. LYONS & CO. LTD.) * column 8, line 1 - line 19 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H05B
Place of search		Date of completion of the search	Examiner
THE HAGUE		7 September 1998	De Smet, F
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.02.92) (P4/C21)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.